Innovative teaching models for English general education courses in Chinese universities under the dual carbon goals

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Abstract. The dual carbon goals is a significant strategy made by Chinese government to promote the initiative of the community with a shared future for humanity and achieve environmental sustainable development. To fulfill this mission, Chinese universities actively integrate the dual carbon goals into various disciplinary subjects, which is considered a crucial responsibility. Among them, the English general courses also bear the responsibility of nurturing environmental awareness and global responsibility of students. This article aims to explore reforms of English general education under the dual carbon goals, focusing on curriculum material revision, instructional process design, the cultivation of practical skills, the integration of research and teaching, and the development of teaching teams. Positive teaching outcomes have been yielded, and the teaching model of “integrating the dual carbon goals with competition-based learning” has been obtained, providing guidance and reference for the reform of general education courses in universities.

1 Introduction

The national goal “2030 carbon peak and 2060 carbon neutrality” (hereinafter referred to as the dual carbon goals) not only has provides a clear direction for China’s energy structure development, but has raised higher requirements for the education field of China [1]. In April 2022, the enhancement of higher education training system plan under the dual carbon goals was issued by the Chinese Ministry of Education, which highlights an important task that is integrating green and low-carbon concepts into the education and teaching system (according to MEC, http://www.moe.gov.cn/srcsite/A08/s7056/202205/t20220506_625229.html). Thus, Chinese universities have actively committed to incorporating green and low-carbon concepts into the educational curriculum. This initiative not only serves as a proactive response to China’s dual carbon policy, but also represents the significant measure taken to cultivate students with environmental awareness and a sustainable development perspective, as well as to train more professionals to address the climate change and environmental challenges.

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The general education of English for non-English majors aims to cultivate students’ critical thinking and humanistic qualities, equipping them with basic English listening, speaking, reading, and writing skills. Simultaneously, it emphasizes expanding students’ academic perspectives and fostering a scientific spirit. In a variety of English general education courses, such as “English Reading” “Academic Writing” and “English Speaking and Rhetoric”, these courses not only enhance students’ awareness of challenges in cross-cultural communication but also significantly facilitate the alignment of these courses with dual-carbon goals. In the context of the dual carbon goals, the teaching cases related to the “dual carbon” theme and teaching plans integrating with English language instruction have been designed. And the assessment methods to enhance students’ emotional identification and active participation in “dual carbon” theme teaching has been reformed. This innovative approach provides valuable insights and references for the “dual carbon” theme teaching in English general education courses [2-41].

The integration of green and low-carbon concepts into China’s higher education system, particularly in English general education courses, reflects a proactive response to the nation’s dual carbon goals. These initiatives not only align with China’s dual carbon policy but also play a pivotal role in nurturing environmentally aware students with a sustainable development perspective. By incorporating these essential concepts into general English education, universities are not only equipping students with language skills but also fostering critical thinking, humanistic qualities, and a scientific spirit. English general education courses, such as “English Reading” “Academic Writing” and “English Speaking and Rhetoric” have been strategically designed to enhance students’ awareness of challenges in cross-cultural communication while concurrently addressing the dual carbon goals. Teaching cases related to the “dual carbon” theme and integrated teaching plans have been developed within the context of these courses. These innovative approaches aim not only to educate students on the importance of environmental sustainability but also to actively engage them in addressing climate change and environmental challenges. Furthermore, the implementation of assessment methods that promote emotional identification and active participation in “dual carbon” theme teaching represents a significant step towards cultivating a generation of students who are not only knowledgeable but also passionate about environmental responsibility. As Chinese universities continue to lead the way in incorporating green and low-carbon concepts into their curricula, they are contributing significantly to the nation’s efforts to achieve its dual carbon goals. These educational initiatives provide valuable insights and references for the broader integration of sustainability principles into educational systems worldwide, emphasizing the crucial role of education in addressing global environmental challenges. Through these efforts, China is shaping a brighter and more sustainable future for its students and the world at large.

2 Refine course objectives with the dual carbon goals

In the context of the dual carbon goals, the reform of university English general education courses serves a dual purpose that extends beyond traditional language instruction. While language practicality and application remain essential, the overarching objective is to cultivate students’ deep emotional identification with the principles of low-carbon environmentalism. This multifaceted approach reflects the understanding that language proficiency alone is insufficient; it must be coupled with a profound connection to pressing global issues like climate change and sustainability.

To achieve these multifaceted goals, the teaching team has meticulously divided course objectives into two distinct categories: skill objectives and emotional objectives. These categories work in harmony, ensuring that students receive a comprehensive and holistic educational experience. The skill objectives are at the core of the curriculum, focusing on
nurturing students' cross-cultural practical language abilities and instilling in them a lifelong commitment to learning. By seamlessly incorporating lower-carbon case studies into the lecture content, these objectives effectively bridge the gap between language proficiency and practical environmental knowledge. This approach not only enhances students’ language skills but also empowers them to actively seek out real-world application cases within their respective majors related to the dual carbon goals. In doing so, students gain a more profound understanding of their roles and responsibilities in contributing to low-carbon environmental actions. This practical dimension ensures that language proficiency is coupled with the ability to apply that knowledge in meaningful and impactful ways. Concurrently, the emotional objectives are strategically designed to motivate and inspire students to take an active role in environmental conservation activities. These objectives go beyond the realm of passive acceptance of environmental awareness; they aim to effect a transformation in students’ attitudes. The ultimate goal is to shift students from the passive acceptance of “you should be environmentally conscious” to the proactive declaration of “I want to be environmentally conscious” [2]. This profound shift empowers students to evolve from passive recipients of the environmental message to enthusiastic champions of the low-carbon environmental movement. The reformation of university English general education courses not only equips students with essential language skills but also fosters a profound emotional connection to low-carbon environmentalism. This comprehensive approach ensures that students not only comprehend the theory behind the dual carbon goals but are also inspired to take concrete actions to contribute to a sustainable and environmentally conscious future. Through this transformative educational experience, students evolve from passive learners to proactive advocates, shaping a brighter and more sustainable future for all.

3 Reform plan for English general education courses in the context of the dual carbon goals

3.1 Reconstruction teaching resource repository

To integrate the environmental conservation concepts into university English general education courses, it requires in-depth research into the dual carbon concept, systematic reorganization and reconstruction of teaching resources, rather than merely textbooks selection. The teaching team primarily focuses on three key areas: English textbooks, electronic resources, and case collections, with the aim of continuously enhancing teaching materials. It aimed at providing students with a more immersive and comprehensive learning experience, ultimately facilitating the seamless integration of environmental conservation principles into the English learning process.

Firstly, the diverse environmental protection courses should be designed in alignment with textbooks. With the increasing emphasis on ecological civilization, the university English textbooks encompass a wide range of ecological and environmental content. And these materials can be used, designing diverse classroom activities, to guide students in establishing a strong ecological civilization outlook and environmental awareness while aquiring ecological knowledge. For instance, when explaining ecological environments, the real-life situations should be connected guiding students to deeply contemplate the dialectical relationship between environmental protection and economic development, which helps students realize the urgency and importance of environmental protection more profoundly within the context of English learning. Secondly, the internet technology such as Python can be used to collect and create relevant electronic materials, making complex concepts clearer and more understandable. It not only helps emphasize key points but also sparks students’ interest and initiative through engaging presentations. Finally, through the case-based
teaching, the dual carbon concept can be integrated into practical life. By selecting typical cases and combining them with the teaching content, students can easily comprehend and apply relevant theories. By utilizing the teaching cases, students can be transformed from passive recipients of environmental knowledge into active learners. Thus, the teaching mode not only enhances students’ English proficiency but also fosters their willingness and confidence to actively engage in environmental actions in real life. Through these innovative teaching methods, the environmental conservation concepts are effectively integrated into the English learning, making positive efforts in cultivating English students with a strong sense of responsibility and environmental awareness.

3.2 Innovative teaching mode

With the support of information technology and the abundant resources available on online learning platforms, the integration of the dual carbon concept into general education courses through the innovative blended teaching mode is primarily divided into three stages. In the pre-class stage, students are provided with instructional resources and assigned pre-reading tasks. Students should engage in pre-reading, complete assignments. After a few weeks of teacher-led learning, students should organize their own project teams to prepare for the dual carbon theme project tasks. During in-class stage, the teaching cases are categorized into four or five thematic modules based on teaching content. The impact of the dual carbon goals on the economy and the environment are explained by explaining the cases, guiding students through in-class questioning and discussion. When relevant thematic modules align with students’ topic presentations, students are scheduled to deliver group presentations. During the group project presentations, the students engage in open questioning and mutual assessment. Identify errors or deficiencies in students’ explanations, and teachers should then provide corrections or summaries, serving as guides and quality controllers. This approach not only enhances students’ English language proficiency but also improves their self-directed learning abilities and sense of achievement, ultimately leading to more effective and higher-quality learning outcomes. In the post-class stage, we provide practical demonstration videos for review and extension. Students can use the online learning platform during their free time for independent learning and engage in group activities to complete project tasks. Monitoring students’ learning trends through the online platform data allows us to tailor teaching goals to their individual needs.

3.3 Curriculum practical component reformation

In the practical component of English general education courses in universities, in order to better integrate the dual carbon goals into general education, we encourage students to combine environmental protection theories with practical applications. An innovative teaching and evaluation model should be implemented to ensure the achievement of teaching objectives.

Firstly, students are encouraged to actively participate in community activities, environmental projects and practical activities. Their language proficiency and low-carbon awareness after participating in these practical experiences are assessed through forms such as essays and translations related to low-carbon themes, which provides strong feedback for the achievement of teaching objectives. Secondly, the extracurricular content should be expanded to strengthen the environmental education practices. Through practical actions, students are nurtured in environmental habits and ecological consciousness, enabling them to truly engage in and promote environmental actions. In promoting environmental education practices through extracurricular activities, a multidisciplinary practice teaching model of “theory→practice→competition” is adopted, using competitions to enhance students’
application abilities of the dual carbon concept and their innovative spirit. Through their engagement in community activities and energy companies, students gain a deeper understanding of the dual carbon goals. They actively participate in national university competitions centered on energy conservation, emissions reduction, and ecological civilization innovation. Additionally, they have the autonomy to assemble teams, select topics, and attain outstanding results through presentations, defense, and other means, ultimately fulfilling the objective of learning through competition. Based on students’ interests, characteristics and knowledge levels, the practice model employs a progressive, gradient-style practice teaching model, which greatly caters to the needs of students at different levels, generates innovation drive, sparks students’ interest in course learning, and also ignites teachers’ enthusiasm for research.

Through these innovations, the teaching model of “integrating concepts plus learning through competition” is formed, organically combining environmental education with the English discipline. This not only strengthens students’ readiness to implement low-carbon behaviors in their respective disciplines, but also enhances their competitiveness in the job market. By means of practical methods, university-industry collaboration, and competition mechanisms, students are cultivated as English talents with a sense of environmental responsibility, and environmental concepts are actively integrated into the education system, making lasting contributions to achieving national environmental goals.

### 3.4 Strengthening the construction of the teaching team

The multi-dimensional efforts are indispensable for the educational team. Firstly, it is crucial to define teaching objectives and incorporate the efficient and clean utilization of energy while supporting the dual carbon goals as a new teaching philosophy. It helps guide curriculum development, ensuring that teaching content closely aligns with contemporary needs. Secondly, the regular curriculum team meetings should be held, to provide a platform for teachers to share their teaching experiences. Through the exchange of information, teachers draw insights from other’s teaching practices, continuously optimizing teaching strategies, thereby enhancing overall teaching effectiveness. Simultaneously, the integration of the teaching team with the research team is critical in boosting the team’s overall innovation capacity. Through interdisciplinary collaboration, teachers can integrate the latest research findings and practical experiences into their teaching, creating more insightful teaching content, and enabling students to better understand and apply the dual carbon goals.

To ensure the high level of teaching faculty, the mentorship program for young teachers can be adopted, where the senior teachers and core faculty members serve as mentors to guide young teachers in continuous learning and exploring innovative teaching methods. Additionally, teachers are required to attend corporate training, during winter and summer vacations, to enhance their practical abilities and incorporate industry dynamics into the classroom. Through project collaborations, inter-university exchange, and cooperation among teaching teams are promoted, further elevating the level of innovative teaching. For the flipped classroom model, universities should actively assemble a high-caliber teaching team. The technical training should be provided to assist teachers in overcoming information technology challenges, so that they can create teaching videos that integrate environmental conservation concepts. Additionally, the environmental awareness among teachers should be strengthened through special lectures and exchange activities. And the inter-faculty discussions can be organized where the teachers can work in groups to delve deeply into the curriculum, design video content related to environmental conservation concepts, continually enhance their professional skills, and better integrate environmental education with English teaching.
In summary, the development of English teaching teams is a crucial component in integrating the dual carbon goals into education. By setting clear teaching objectives, maintaining regular communication, integrating research and teaching, providing training, and organizing exchange programs, a highly professional, innovative, and environmentally conscious teaching staff can be cultivated. It will contribute significantly to the education of students with a global perspective and a sense of environmental responsibility.

3.5 Research and Teaching Integration

In the context of the dual carbon goals, the integration of research and teaching in English education has become even more urgent and essential. Unlike primary and secondary education, the teaching staffs in university have the opportunity to incorporate cutting-edge academic research into their teaching practices, thereby enhancing the depth and foresight of their instruction. The staffs with high levels of research expertise can bring deeper insights into their teaching, seamlessly integrating the latest academic findings with course content, enabling students to better grasp the underlying logic of knowledge and achieve a deep and clear teaching effect.

In the teaching process of English general education courses, integrating the concepts of environmental conservation and sustainable development into the English curriculum allows students to gain a profound understanding of the connection between knowledge and societal issues. They also come to realize the importance of English in addressing energy and environmental problems. This approach guides students to understand the contributions of English knowledge to solving environmental challenges, as well as its significance within the context of dual carbon goals. It also bridges the gap between traditional curriculum knowledge and the latest research, enabling students to better grasp the real-world applications of their knowledge. Furthermore, the participation of students in research projects related to their teachers’ course content should be encouraged, which allows them to apply their knowledge to solve practical problems, thereby enhancing the overall qualities and innovative abilities. In the context of the dual carbon goals, the involvement in environmentally related research projects can provide students with a better understanding of the practical application of English knowledge in environmental conservation practices. It also nurtures their awareness of environmental issues and their problem-solving skills.

In conclusion, in the context of the dual carbon goals, the integration of research and teaching in English education has become even more closely intertwined. By incorporating the latest academic achievements into their teaching and encouraging students to participate in research projects, the English education becomes more relevant to practical needs. This approach nurtures students with a sense of environmental responsibility and innovative capabilities, actively contributing to the achievement of the dual carbon goals.

4  Curriculum development achievement

Under the dual carbon goals, the development and practice of English general education courses have achieved significant teaching effects, meeting the expected teaching objectives. Firstly, in the classroom, students’ proactivity in learning has significantly improved as they actively participate in group collaborations and present classic case studies, drawing conclusions and lessons from these cases. Secondly, the end-of-semester group learning outcomes and exam results indicate substantial improvements in students’ English speaking and specialized vocabulary, along with increased confidence and enthusiasm. Thirdly, the improvement in teaching content and the use of diverse teaching methods have generated a strong interest in learning among students. The records of online courses show that teaching videos have been viewed more than 500 times. Results from student questionnaires show that
70% of students believe that the all-English teaching mode greatly improved their professional English skills and oral expression abilities. And 80% of them state that the “learning by teaching” teaching mode has broadened their knowledge base while increasing their interest in the subject. 90% of students have expressed the better understanding of the dual carbon goals through participating in English general courses. Under the guidance of teachers, students actively participate in energy-related research activities and have achieved excellent results in national energy emission reduction innovation programs, and the “Challenge Cup” Chinese University Student Entrepreneurship Competition and others. This mutual teaching and learning process has helped teachers to publish multiple papers in the field of language studies, including those related to the Five-Year Plan of China under the dual carbon goals [3], further promoting the expansion of teachers’ research capabilities.

5 Conclusion

The dual carbon goals represents a national strategy for China to address the climate change and showcase its international responsibility in building a shared future for humanity. Through reforms in the curriculum and teaching materials, instructional process design, practical skills development, research and teaching integration, and the development of teaching teams in English general education under the dual carbon goals, significant progress has been made. A teaching model that “integrating the dual carbon goals with competition-based learning” has been obtained and demonstrated certain teaching effectiveness.

By incorporating the dual carbon goals into English general education, the environmental concepts are transmitted to students, enhancing not only their language proficiency, but also cultivating interdisciplinary understanding of the dual carbon goals. The blended online and offline teaching mode provides a strong opportunity for the integration of English education and environmental concepts. By fully utilizing the modern information technology and online teaching resources, teachers can better design instructional content and create a conducive environment for the dissemination of dual carbon concepts. Teaching practice results show that the dual carbon goals, the integration of environmental concepts into English general education not only enhances students’ environmental awareness and application skills, but also makes a positive contribution to achieving the dual carbon goals and promoting low-carbon development. It lays a solid foundation for the nation to cultivate English talents with environmental responsibility and international perspectives. To better adapt to future sustainable development, continuous innovation in teaching models will contribute to the development of students’ environmental literacy and overall abilities.

The adoption of the dual carbon goals represents a pivotal national strategy for China, signifying its commitment to addressing the pressing global issue of climate change and asserting its international responsibility in shaping a shared future for humanity. This multifaceted approach has brought about substantial advancements through comprehensive reforms encompassing curriculum development, the selection of teaching materials, instructional process design, practical skills cultivation, research and teaching integration, and the strengthening of teaching teams within the realm of English general education under the dual carbon goals. A noteworthy teaching model, known as “integrating the dual carbon goals with competition-based learning” has emerged and has shown promising effectiveness in the realm of education. By incorporating the dual carbon goals into English general education, a conduit has been established through which environmental concepts are imparted to students. This integration serves to enhance not only their language proficiency but also fosters interdisciplinary comprehension of the dual carbon goals, recognizing that environmental sustainability is a global concern that transcends linguistic and disciplinary boundaries.
The adoption of a blended teaching mode, which combines online and offline components, has presented a substantial opportunity to fuse English education with environmental concepts. Leveraging modern information technology and an abundance of online teaching resources, educators are better equipped to design instructional content that effectively conveys the intricacies of dual carbon concepts. This approach creates an enriched learning environment that facilitates the dissemination of essential knowledge regarding low-carbon practices and environmental stewardship. Empirical evidence from teaching practice substantiates that the integration of environmental concepts into English general education not only heightens students’ environmental awareness but also equips them with practical skills to apply this knowledge in real-world scenarios. Furthermore, this holistic approach contributes positively to the attainment of the dual carbon goals and the promotion of low-carbon development, aligning with China’s national objectives. The integration of the dual carbon goals into English general education lays a robust foundation for cultivating English talents imbued with environmental responsibility and global perspectives. Recognizing the importance of preparing students for a sustainable future, continuous innovation in teaching models will undoubtedly play a pivotal role in enhancing students’ environmental literacy and overall capabilities. It is through these innovative teaching approaches that we can nurture a new generation of individuals equipped to actively engage in environmental conservation and contribute to the realization of a more sustainable and environmentally responsible world.

In conclusion, China’s resolute commitment to the dual carbon goals extends far beyond its borders, emphasizing its profound dedication to global environmental stewardship. By strategically incorporating environmental concepts into the fabric of English general education, China is not only bolstering language proficiency among its students but also cultivating a new generation of conscientious global citizens. These individuals are poised to take proactive steps toward realizing a sustainable and low-carbon future, not just within China but as contributors to a shared destiny for all of humanity. This visionary approach to education is a testament to China’s recognition of its pivotal role on the world stage, where environmental challenges demand collective action. Through English general education infused with environmental principles, China is empowering its students to navigate an interconnected world and make meaningful contributions to the global effort to combat climate change. In the journey toward a greener, more sustainable planet, China’s investment in the education of its youth is a beacon of hope. It highlights the transformative power of education in shaping a better future for all, where environmental responsibility knows no boundaries and where a low-carbon ethos unites us in our shared commitment to a healthier planet.

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